

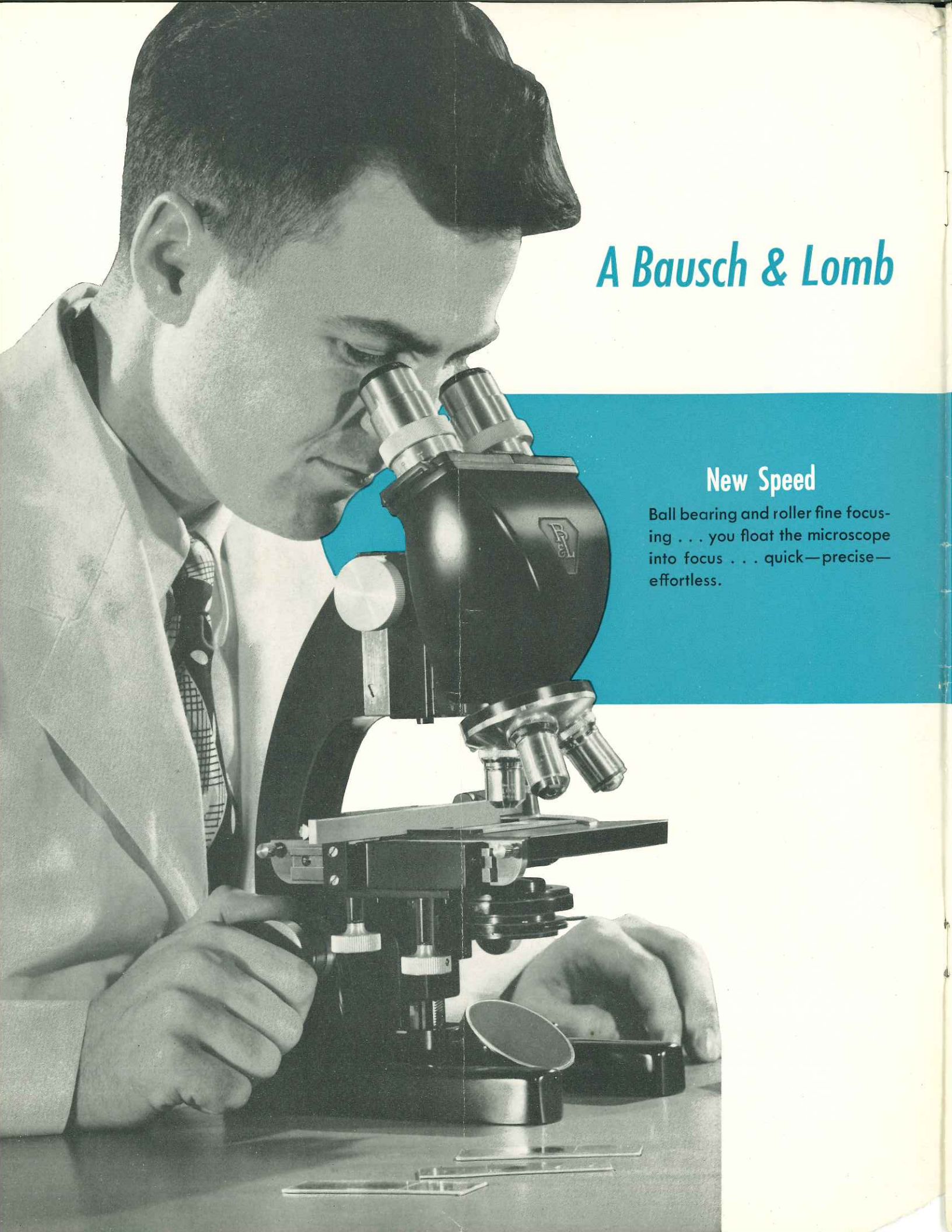
Bausch & Lomb

 *Dynoptic*

**LABORATORY
MICROSCOPES**



ACCEPTED AS THE WORLD'S FINEST LABORATORY MICROSCOPES



A Bausch & Lomb

New Speed

Ball bearing and roller fine focusing . . . you float the microscope into focus . . . quick—precise—effortless.

U. S. Patent Office
AUG 19 1955
Design Division

Dynoptic Laboratory Microscope

*represents more value
for the money than any
other in the world*

New Accuracy

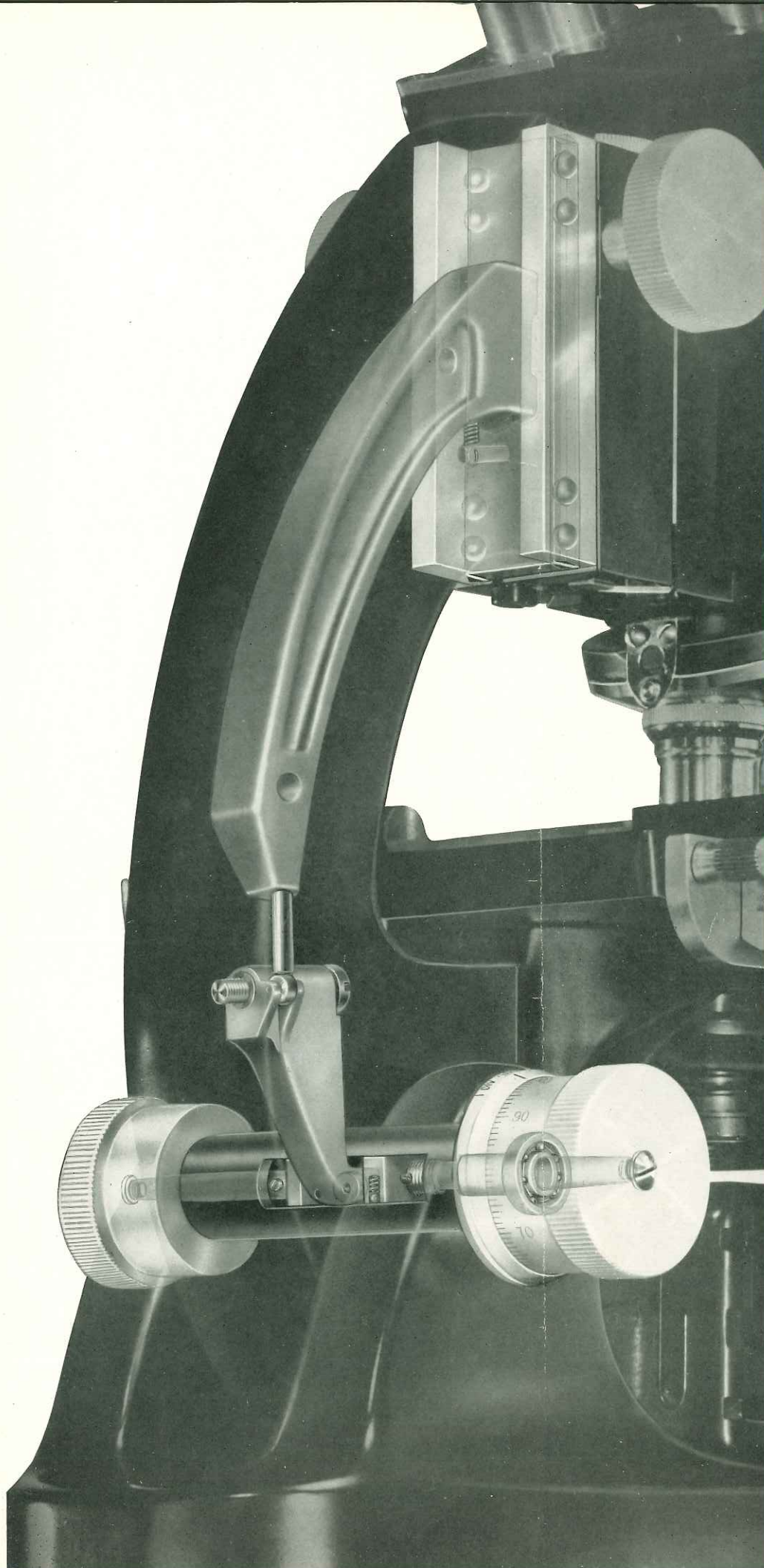
Bausch & Lomb optical parts plus the most modern mechanical design . . . *Roto-sphere* ball-bearing nosepiece assures exact repeats.

New Convenience

Low position hand-on-table focusing and below stage manipulation of mechanical stage controls . . . fatigue-free operation over extended periods.

When you buy a Bausch & Lomb *Dynoptic* Laboratory Microscope you get a product embodying the results of years of effort on the part of a century-old concern to design and build for your use the very finest instrument your money can buy, anywhere.

This catalog is designed to help you make your microscope purchase one which will give you the greatest return of any equipment investment you ever made. You will find it interesting and profitable reading.



1

Dua-rol
Low Position Ball-bearing
and Roller Fine Adjustment

2

Roto-sphere
Ball-bearing, Revolving
Nosepiece

3

Unitized
10X Objective

4

Removable Mechanical
Stage with Below-stage
Controls

5

Vacuum-controlled
Spring Slide Holder

6

Variable Focus Condenser
for either rack and pinion
or plain substage

7

Automatic Focusing

8

Full 360-degree Substage
Ring Mount

9

Bausch & Lomb Optics . . .
The World's Finest

These 9 points **are the guideposts to quality microscope performance**

Profitable ownership and pleasing operation . . . these qualities make the *Dynoptic* Laboratory Microscope the one best buy. Quality of work, speed and ease of operation result from the combination of unsurpassable optics and modern mechanical design.

The nine salient features of these microscopes, developed in succeeding paragraphs, convey some sense of the almost incredible care that goes into the construction of these instruments. Bausch & Lomb scientists are respected all over the world as possessing the know-how which has kept the Company in a position of leadership for over a hundred years. And in the *Dynoptic* line they have combined optical and mechanical designs to make these models outstanding for years of faithful service.

1. *Dua-rol* Low Position Fine Adjustment

The easy-focus mechanism rides on ball-bearings and rollers which convert the slightest movement of the knob into vertical travel of the objective. Friction-free, wear-resistant, and effortless—this focusing mechanism, shown in phantom on the opposite page, minimizes operator fatigue and encourages thorough, complete and accurate examinations. The large king size knob has one micron divisions, convenient in estimating thickness or depth in a specimen and also indicative of the precision which the entire instrument embodies.

Only "three fingers" above the table top, the fine focusing knob permits resting the hand on the table throughout examinations. The operator works in a non-tiring position, with his hand supported, his arm relaxed to make the tiniest possible change in focus a routine matter.

The ball-bearing carrying the fine adjustment shaft is the radial thrust type that not only assures a lifetime of effortless motion but eliminates backlash—when you stop turning the knob your focus stays just where you leave it. Two rollers are the contact points through which the horizontal movement of the worm is converted to vertical movement of the slide.

Both wandering-out-of-focus and binding are avoided by the design of the fine adjustment slide which travels on specially selected pre-loaded ball-bearings in precision ground, hardened steel raceways.

2. *Roto-sphere* Ball-bearing Nosepiece

A ball-bearing nosepiece completes the friction-free focusing design.





Located around the periphery the bearings carry the weight perfectly distributed throughout the entire circumference. A compensator distributes the pressure to all bearing points, cancelling possible wear. Accurate positioning of the objective is assured by a positive ball-stop. Repeat settings are identical throughout a long lifetime of service.

3. Unitized 10x Objective

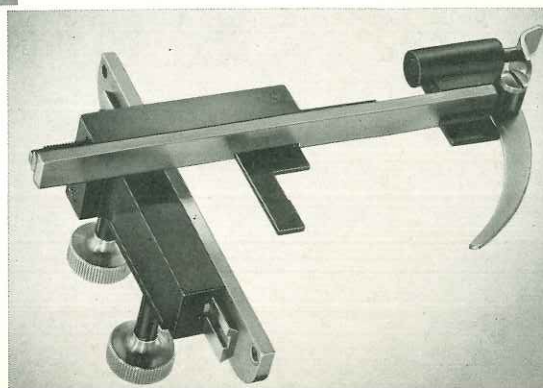
Much larger areas of specimens can now be searched with this 10X achromatic objective with its longer working distance and flatter field. Being non-divisible it eliminates any possibility of misplacing the lower element—a feature that is of special importance where microscopes are in student use.

Permanence of centration and alignment stem from the improved objective mountings with the lenses burnished into diamond-turned, threadless cells. Tolerances of less than .0001" assure a solid fit that rough use will not affect.

4. Mechanical Stage

Valuable savings in time and assurance of precision operation result from the design of the mechanical stage. It is fastened to the microscope stage by two convenient knurled screws. Quickly taken off for rapid scanning, petri dish use or examination of unusually large specimens it is replaced in seconds for regular use. *Dynoptic* Microscopes with plain stages have tapped holes so that a mechanical stage can be ordered later and put on by the user. The graduated mechanical stage permits easy, accurate relocation of particular sections of a specimen slide, systematic searching of slides, or measurement of specimen size. Graduations are in millimeters and verniers reading to tenths of a millimeter.

Where employed, a mechanical stage is subjected to more movement than any other part of the microscope. The metals used in the construction of the B&L mechanical stage reduce wear to a negligible degree. However, should some slight play develop between rack and pinion gear teeth, the operator is provided with the means to compensate for it quickly and easily, by a simple adjustment. Thus, he is always assured of straight line action when moving a slide, eliminating the annoying occurrence of a field moving out of the zone of observation.



5. Vacuum-spring Slide Holder

Speedy, safe positioning of the slide is effected by the combination vacuum controlled spring slide finger which exerts just enough pressure to hold either large or small slides against the stage bars. Three-way pressure, downward, sideways and back keeps the slide in the proper position.

Control knobs are below the stage and in line with the right hand fine focusing knob, resulting in the notable Bausch & Lomb "straight line operational procedure." Knobs are screwed on the pinions and setscrews permit pressure adjustment to suit different operators. Comfortable operation induces better examinations, especially those extended ones with much shifting of the slide and refocusing. All slide movement and fine focusing is done with the arm and hand relaxed and resting comfortably on the table top. This "armchair position" coupled with the feather touch ball-bearing focusing train make the *Dynoptic* microscope a real pleasure to use.

6. Variable Focus Condenser

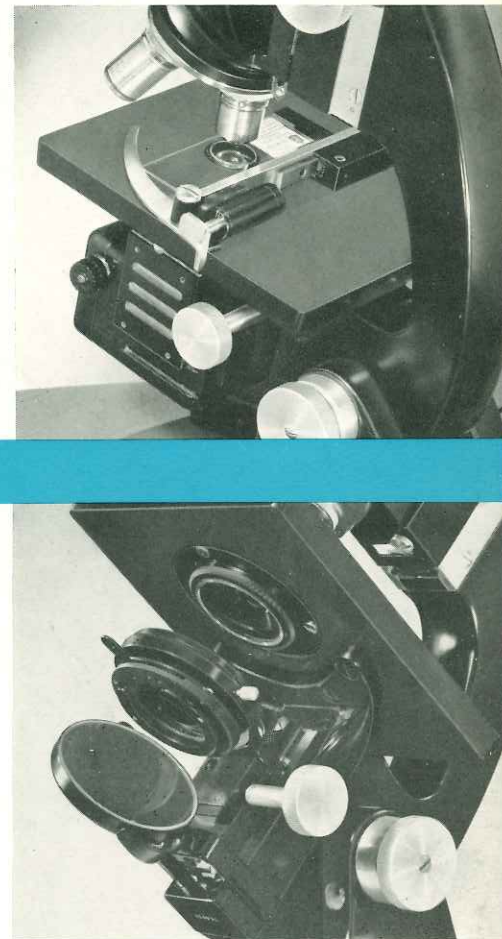
Further savings in time and work, and a marked improvement in performance result from the use of the Variable Focus Substage Condenser.

With the Variable Focus Condenser and a separate light source you instantly change the form of illumination for different objectives. There is no bothersome stopping to take the condenser apart. Specimen examination is fast and continuous. You simply change objectives by rotating the *Roto-sphere* nosepiece while simultaneously matching the N.A. of condenser and objectives, thus attaining maximum resolving power. All models in the *Dynoptic* line can be equipped with this feature. On those having a rack and pinion substage the upper element of the condenser is mounted on the underside of the stage in a fixed, centered position. The lower element is inserted in the 360-degree full-ring mount of the substage. For models with plain substage the Variable Focus Condenser has both elements mounted in a tubular case with the lower element raised and lowered by a ring.

7. Automatic Focusing

The operator saves a great deal of time and is spared considerable annoyance by the automatic focusing arrangement built into these microscopes. When working with slides of equal thickness, it is only necessary to make the original adjustment for focus—thereafter any one of the slides will be in sharp focus for the same objective, without further adjustment, no matter how many times the microscope body is racked up and down. Or, if desired, the nosepiece can be rotated to

U. S. Patent Office
AUG 19 1955
Design Division



any one of the parfocal objectives and the slide brought back into sharp focus with just a touch of the fine focusing knob. Another advantage of this arrangement is that it eliminates cover glass and slide breakage and prevents damage to objectives. Adjusted at the factory to function with slides of 1.2-1.3mm thickness, the automatic focus stop can be easily set for any thickness of slide by the user.

8. 360-degree Substage Full-Ring Mount

To achieve a more sharply defined image and to eliminate distortion it is extremely important that the substage condenser be held in rigid and accurate centration, and nothing is so permanently held in accurate center as a cylinder in a full-ring mount. The bearing faces of the condenser ring mount and the support ring are diamond-turned to assure the most precise fit possible, so that there is never any tendency to tilt the condenser off vertical axis. The smoothness of these bearing surfaces also permits the condenser to be inserted or removed with ease.

9. Bausch & Lomb Optical Elements ... long recognized as the world's standard

Graduated Drawtube

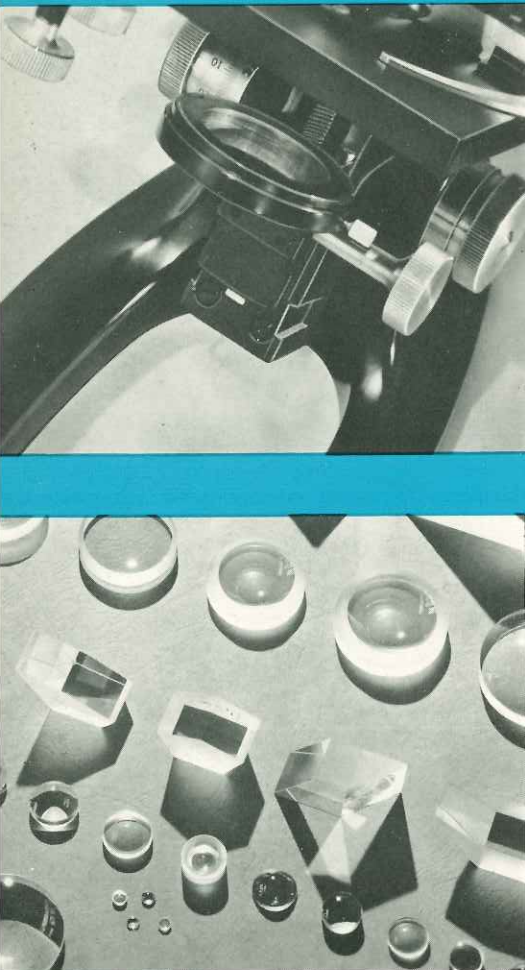
To give even greater precision and versatility in performance all *Dynoptic* models can be optionally fitted with a graduated drawtube having an adjustment range of 145-175mm. This tube is available separately for attachment to fixed length monocular tubes on Series *F* and *C* microscopes, or it can be had as an integral part of a monocular tube for interchange with the microscope bodies of Series *C* and *T* models.

The drawtube provides three important advantages:

1. It compensates for small differences in cover glass thickness with high power, high N.A. dry objectives.
2. It permits small changes in initial magnification so that, in calibrating micrometer eyepieces for purposes of measuring, an even factor can be obtained.
3. It can be used to hold a low power objective and thereby secure lower magnifications than if the same objective were held in the nosepiece.

Interchangeable Tubes and Bodies

To permit you to choose the instrument best suited to your present requirements and budget and still be in a position to adequately meet future require-



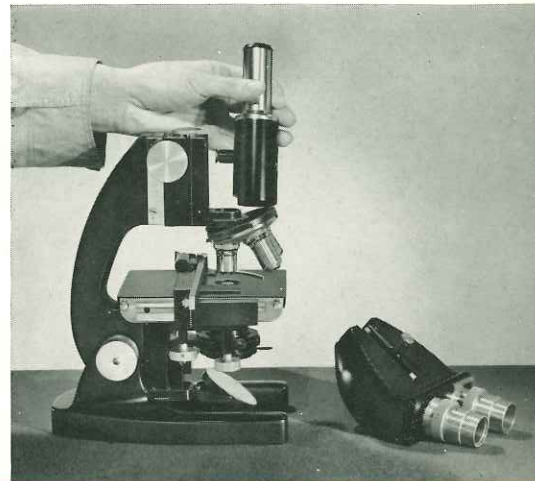
ments, monocular and binocular bodies are available to be used interchangeably on both the *C* series and the *T* series. The monocular tube on a *C* series model can be replaced by a binocular body for the fatigue-free viewing the latter affords over extended observation periods. Or the binocular body of a *T* series model can be replaced by a monocular body for work in micro-projection, photomicrography and measurement. This interchangeability is accomplished merely by loosening a thumbscrew on the top of the microscope arm—field position is not disturbed.

Binocular bodies are supplied with unit magnification permitting larger field size, and greater illumination with the same amount of light than those with a magnification factor. Eyepieces are parallel so that ocular muscles are fully relaxed and images are fused normally and easily.

Illumination is always in complete balance between the two sides of the binocular body. Prism mounts are extremely strong to insure that prisms will remain in alignment and the two images perfectly superimposed.

Adjustment for interpupillary distance is made speedily and accurately by means of a knurled adjusting ring which moves both eyepiece tubes. A millimeter scale enables the observer to select his correct adjustment at any time merely by setting to the known scale reading. And because the eyepieces are parallel, the setting for interpupillary distance does not change, no matter which length eyepiece is used.

To compensate for the difference in visual acuity between the eyes, one eyepiece of the binocular body has a focusing collar to permit independent focusing of that eyepiece.

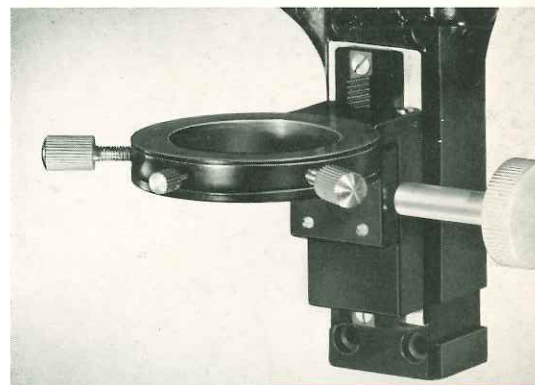


Simple Centering Substage

Any *Dygnoptic* microscope with rack and pinion substage can be optionally fitted with the simple centering substage, to achieve the ultimate in precise coaxial alignment of condenser and objective so necessary for work requiring the highest order of optical efficiency. Two thumbscrews bear against the inner ring of the substage mount and can be adjusted to effect a centering movement of approximately 2mm range. A clamp screw secures the condenser in position.

Quick On-and-off Mirror Bracket

All *Dygnoptic* models are supplied with a fork quick on-and-off mirror bracket as standard equipment. This scientifically designed bracket straddles the substage post in grooves machined to provide a close bind-free fit. A slot in each side of the bracket permits maintaining the desired pressure. There is no sagging or shifting of the mirror, which is firmly held in line but instantly removable. Mirror is the Bausch & Lomb standard high quality 55mm diameter, plano-concave.





Need and expected use are the determining factors in the choice of a microscope.

The following information is intended to be helpful in selecting a specific instrument from among the many models listed on the succeeding pages.

TO HELP YOU CHOOSE **the right model microscope**

It is possible to divide the Bausch & Lomb line of compound laboratory microscopes into several groups based on their mechanical and optical design and end use.

GROUP I. *Elementary Student and Laboratory Microscopes.*

These lower priced instruments consist of the model *FL* microscope of simple construction, and the more versatile *Dynoptic Series F* microscopes having the plain substage as pictured and described on pages 20-21.

These instruments are most frequently used for elementary biological work by:

1. High School Science Laboratories.
2. Elementary College Science Laboratories in the study of biology, botany and zoology.
3. Hobbyists and amateur microscopists.

All B&L microscopes in this category are monocular types of standard size and are operated in the conventional manner. This group of *Dynoptic* microscopes can be provided with optical combinations providing magnifications equal to those of the more advanced instruments. However, magnifications most commonly desired are up to 430 $\times$.

The model *FL* microscope is a simple, inexpensive, ruggedly built instrument. It is recommended when required magnifications are those of not beyond 430 $\times$. It cannot be supplied with a 97 $\times$ oil immersion objective or substage condenser.

The optical combinations most frequently selected in Group I consist of two objectives:

16mm, 10 $\times$ (low power, dry)

4mm, 43 $\times$ (high power, dry)

and one eyepiece, 10 $\times$, providing magnifications of 100 $\times$ and 430 $\times$. A lower power objective may be desired for botanical studies or other observations where a larger field of view and lower magnification become useful. Other eyepieces above and below 10 $\times$ are available to increase the range of magnifications with microscopes in Group I.

The design versatility of the *Dynoptic Series F* microscopes in

Group I permits the use of the 97 $\times$, 1.25 N.A. oil immersion objective, since a condenser of 1.25 N.A. can be supplied in a simple mount at the time of purchase, or added at a later date. This permits their use for some advanced work in the biological sciences, where magnifications in the order of 1000 $\times$ are required, such as histology, hematology, bacteriology, embryology, and cytology.

While a mechanical stage is not always required, it can be added by the user if desired without returning the instrument to the factory.

GROUP II. *Advanced Student, Laboratory and Medical Microscopes.*

These more elaborate and versatile instruments make up the balance of the microscopes described in this catalog. They consist of the Series *F* and Series *C* monocular microscopes (fixed and convertible). Also included is the Series *T* binocular microscope. All of these instruments are supplied with the rack and pinion substage for the 1.25 N.A. substage condenser. A mechanical stage for precise movement of the specimen slide is desirable in most instances.

These instruments are most frequently used by:

1. Advanced college science laboratories in the study of: Biology, Botany, Zoology, Entomology, Cytology, Anatomy, Bacteriology, Pathology and Histology.
2. Public Health and Hospital Laboratories for Hematology, Urology, Pathology and Bacteriology.

The optical combination most frequently selected for general use consists of three objectives:

- 16mm, 10 $\times$, 0.25 N.A. (low power, dry)
- 4mm, 43 $\times$, 0.65 N.A. (high power, dry)
- 1.8mm, 97 $\times$, 1.25 N.A. (high power, oil immersion)

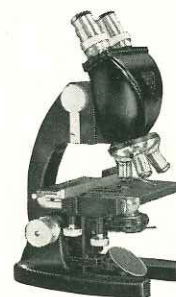
Two powers of eyepieces, 5 $\times$ and 10 $\times$ together with the objectives achieve magnifications of 50 $\times$ to 970 $\times$. A condenser of 1.25 N.A. is required to match the N.A. of the 97 $\times$ oil immersion objective.

Sometimes a lower power "finder" objective or "scanning lens" is desirable for field searching. Several microscope models are available with such a 3.5 $\times$ objective.

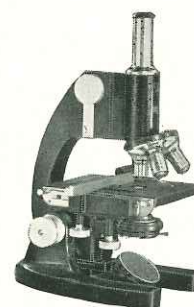
In addition to the standard instruments listed in this catalog certain optical modifications of these standard models are required for a number of specialized applications. Space does not permit a complete listing of these instruments. However, separate catalogs will be sent on request.

Among these are microscopes for:

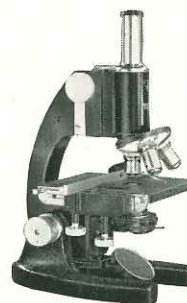
1. Mold and bacteria counts in food examinations.
2. Darkfield microscopes for bacteria detection and particle size determinations and analyses.
3. Textile and paper analyses.
4. Micro-projection and photomicrography.
5. Polarized light observations.
6. Quality control and process engineering in industry.



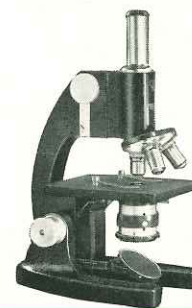
TBV-8



CBV-8



FBV-8



FPH-8

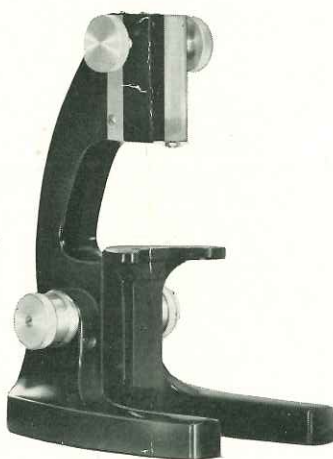
The logic behind B&L model numbers

In referring to the *Dynoptic* Laboratory Microscopes, alphabetical model designations are much simpler to use than complicated catalog numbers. These model tags may seem confusing and merely arbitrary substitutes for catalog numbers. But, actually there is a rational system which determines the groupings. You may be interested to learn just how it works.

The various principal parts which are used in assembling the many available models are indicated in the illustrations below. The stand, left, is common to all models and has no alphabetical tag. The binocular body and the two forms of monocular tubes are assigned the letters *T* for inclined (Tilted) binocular, *C* for Convertible monocular, and *F* for Fixed monocular. Stages are *P* for Plain; *B* for Built-on ungraduated mechanical, and *G* for Graduated.

Substage equipment may consist of simply an iris diaphragm or any of the condensers shown. If the condenser requires a rack and pinion substage, it is furnished.

BASIC STAND



F—Fixed
Monocular Tube



P—Plain Stage



Ring Adapter

D—Iris
Diaphragm



H—Verti-slide
Condenser

Condenser
Sleeve

S—Abbe
Condenser

M—Medium
Aperture
Condenser



With these sketches and their applicable alphabetical designations it is a simple matter to indicate which equipments are wanted. For instance, you may want to buy a microscope with binocular body, a graduated mechanical stage, and medium aperture condenser, so you indicate a model:—*T* for Tilted body; *G* for Graduated mechanical stage; and *M* for Medium aperture condenser, so the model is *TGM*. Or suppose you want a Fixed monocular, Plain stage model with iris Diaphragm—it's an *FPD*.

Any combination desired can be supplied. In indicating the combination you want, disregard naming the stand—that is basic to all. Then select either an *F*, *C*, or *T* tube or body, a *P*, *B*, or *G* stage and *D*, *H*, *S*, *M*, *R*, *V* or *L* substage equipment, naming them in that sequence.

The ring adapter will accommodate either the *D* iris Diaphragm, or the *H* *Verti-slide* condenser. The condenser sleeve is used with either the *S* Abbe condenser, or the *M* Medium aperture condenser. The rack and pinion substage mount will receive either the *R* Abbe condenser, or the *V* Variable focus condenser.

Special optical and mechanical equipment is best selected through discussion with B&L or dealer representatives.

So, by this logical method, your microscope is reduced to a sensible, basic formula.



C—Convertible
Monocular Tube

C and **T** are easily
interchangeable



T—Inclined
Binocular Body



B—Ungraduated
Mechanical Stage



G—Graduated
Mechanical Stage



V—Upper & Lower
Elements
Variable Focus
Condenser

R—Abbe
Condenser



L—Opti-lume Attachable
Illuminator
With Bracket

series

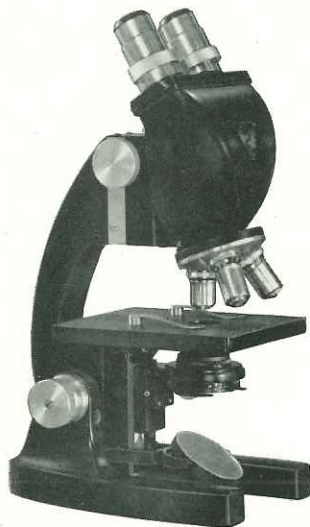
T



TBV-8



TPV-9



TPR-8



TBV-69

**The Binocular Body Series. Monocular tube available
at extra cost for measuring and photomicrography.**

U. S. Patent Office

AUG 19 1955

Design Division

For advanced biological work, medical study and diagnosis as a general purpose microscope in industrial laboratories and wherever the comfort of binocular vision is desirable.

All models in this series have parallel eyepiece tubes; matched rack and pinion coarse adjustment; ball-bearing and roller low position fine adjustment with one micron divisions; *Roto-sphere* ball-bearing, ball-stop, precentered nosepiece; rack and pinion substage with full 360-degree ring mount for condenser; plano-concave mirror in fork quick-on bracket; alcohol- and reagent-resistant black finish; hardwood cabinet.

STANDARD MODELS

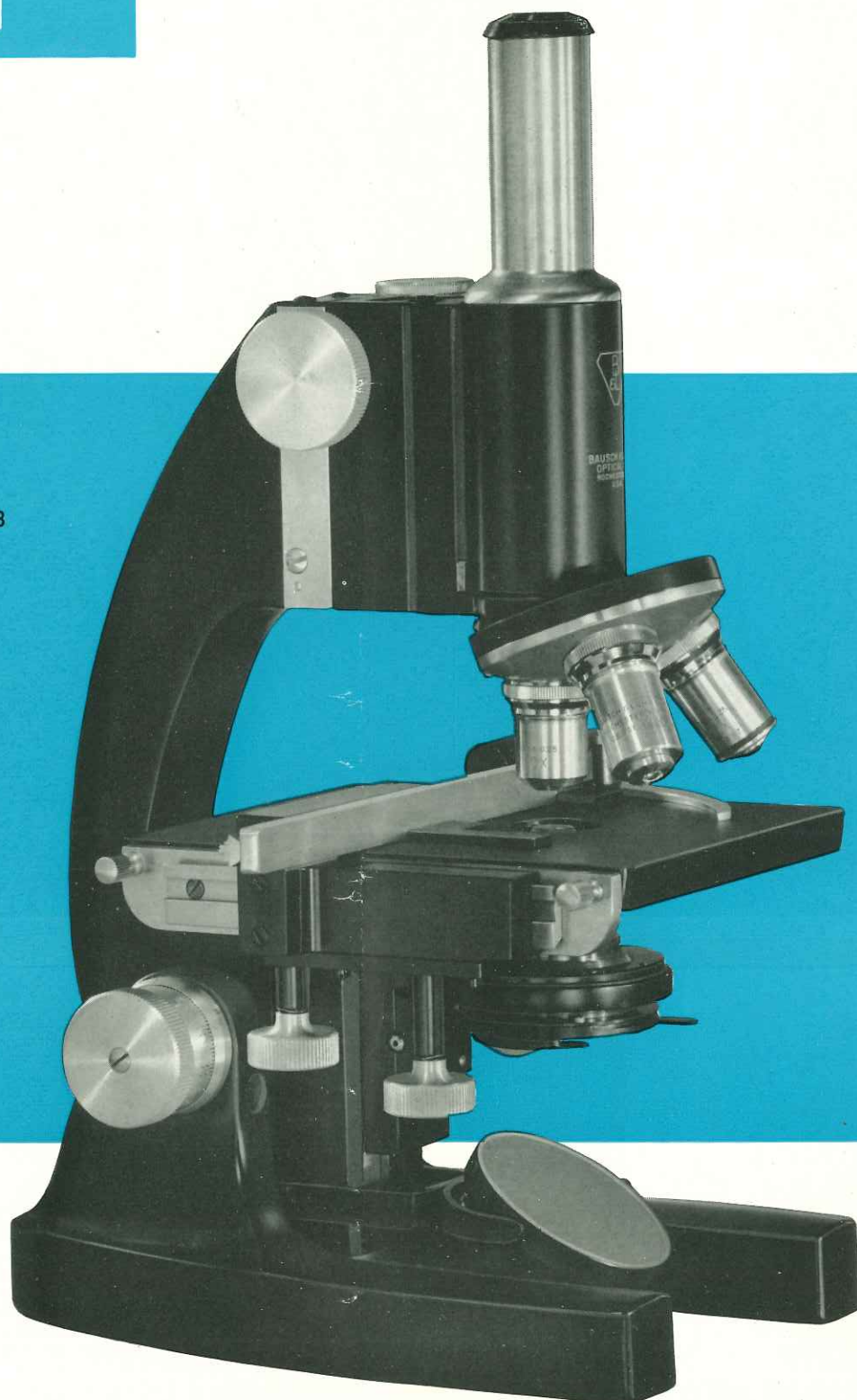
Model No.	Stage	Substage 1.25 N.A. Condenser	Objectives	Eyepieces
TBV-8	Mech.	Var. Focus	10X, 43X, 97X	5X, 10X Huygenian Paired
TBR-8		Abbe	Achromatic	
TPV-8	Plain	Var. Focus	in Triple	
TPR-8		Abbe	Nosepiece	
TBV-9	Mech.	Var. Focus	3.5X, 10X, 43X, 97X	
TBR-9		Abbe		
TPV-9	Plain	Var. Focus	Achromatic	
TPR-9		Abbe	in Quadruple Nosepiece	
TBV-69	Mech.	Var. Focus	10X, 43X, 97X Ach., in Trip. Nosepiece	10X Widefield Paired
TBR-59		Abbe		
TBV-10	Mech.	Var. Focus	10X, 43X Achro. 98X Fluorite in Triple	5X, 10X Huygenian Paired
TBR-10		Abbe	Nosepiece	

Optional accessories, including Opti-lume integral illuminator and Micro-Lite on pages 24-25.

series

C

CBV-8



**The Convertible Monocular Tube Series. Inclined
binocular body available at extra cost.**



CPV-9

Particularly adapted to photomicrography, biological work, medical diagnosis, bacteriology, and blood counting.

All models in this series have matched rack and pinion coarse adjustment; ball-bearing and roller low position fine adjustment with one micron divisions; *Roto-sphere* ball-bearing, ball-stop, precentered nosepiece; rack and pinion sub-stage with full 360-degree ring mount for condenser; plano-concave mirror in fork quick-on bracket; alcohol- and reagent-resistant black finish; hardwood cabinet.



CBV-9

STANDARD MODELS

Model No.	Stage	Substage 1.25 N.A. Condenser	Objectives	Eyepieces
CBV-8	Mech.	Var. Focus	10X, 43X, 97X Achromatic in Triple Nosepiece	5X, 10X Huygenian
CBR-8		Abbe		
CPV-8	Plain	Var. Focus		
CPR-8		Abbe		
CBV-9	Mech.	Var. Focus	3.5X, 10X, 43X, 97X Achromatic in Quadruple Nosepiece	
CBR-9		Abbe		
CPV-9	Plain	Var. Focus		
CPR-9		Abbe		

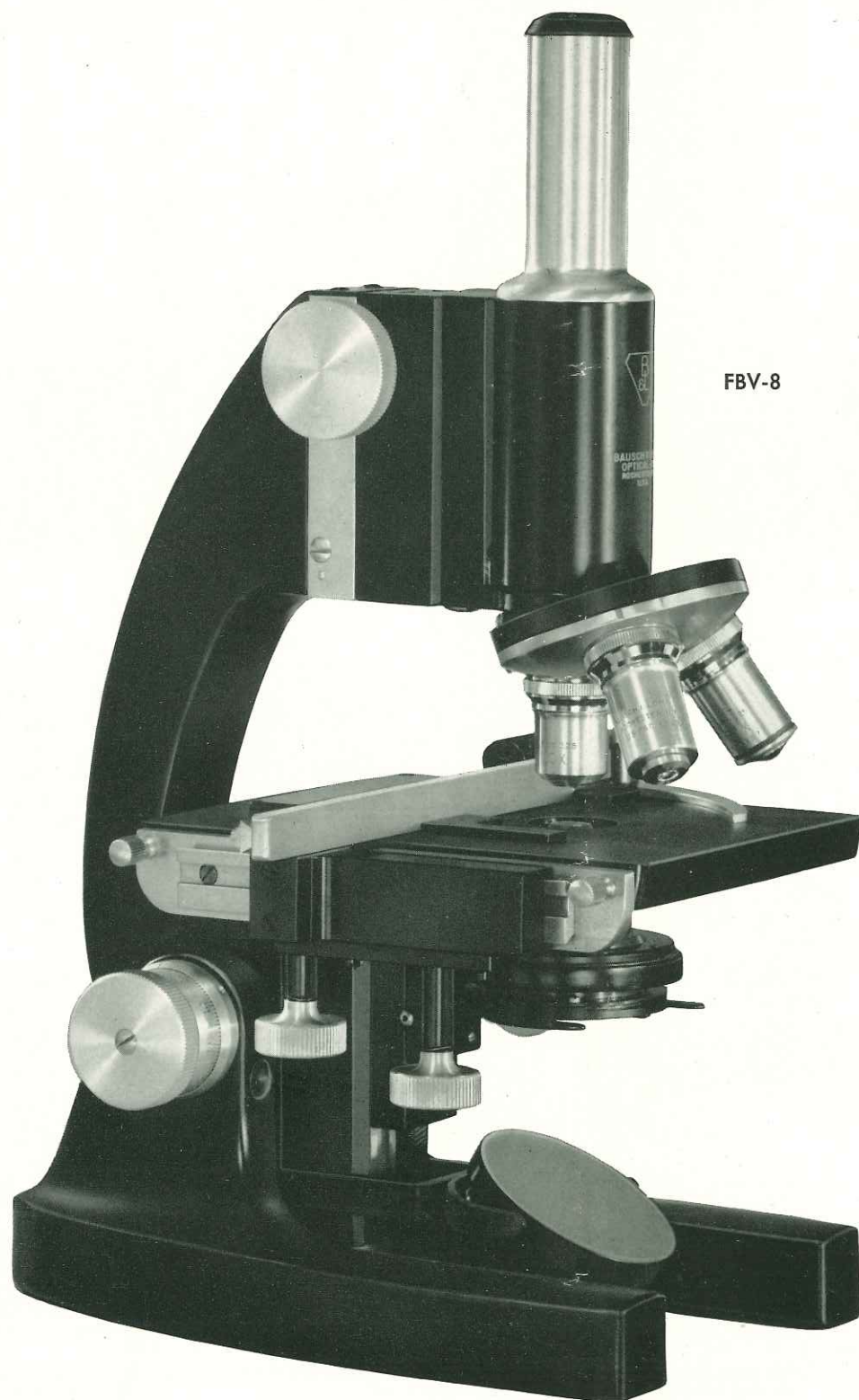


CPR-8

Optional accessories, including Opti-lume integral illuminator and Micro-Lite on pages 24-25.

series

F with Rack and
Pinion Substage



FBV-8

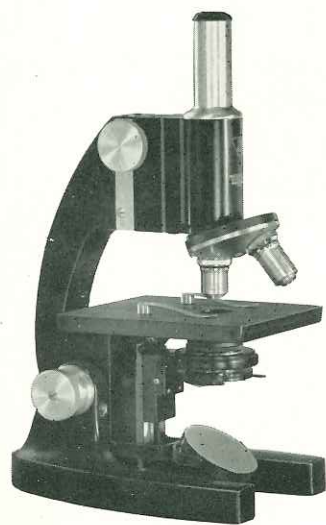


FBV-9

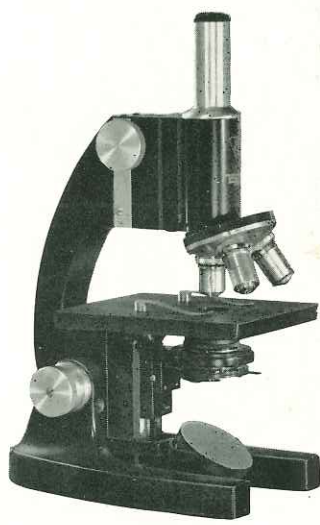
The Fixed Monocular Tube Series. Tube is not interchangeable with a binocular body.

For use in college laboratories, hospitals and all professional microscopy in fields of zoology, anatomy, biology, pathology and as a general purpose microscope in industry.

All models in this series have matched rack and pinion coarse adjustment; ball-bearing and roller low position fine adjustment with one micron divisions; *Roto-sphere* ball-bearing, ball-stop, precentered nosepiece; rack and pinion substage with full 360-degree ring mount for condenser; plano-concave mirror in fork quick-on bracket; alcohol- and reagent-resistant black finish; hardwood cabinet.



FPR-6



FPR-8

STANDARD MODELS

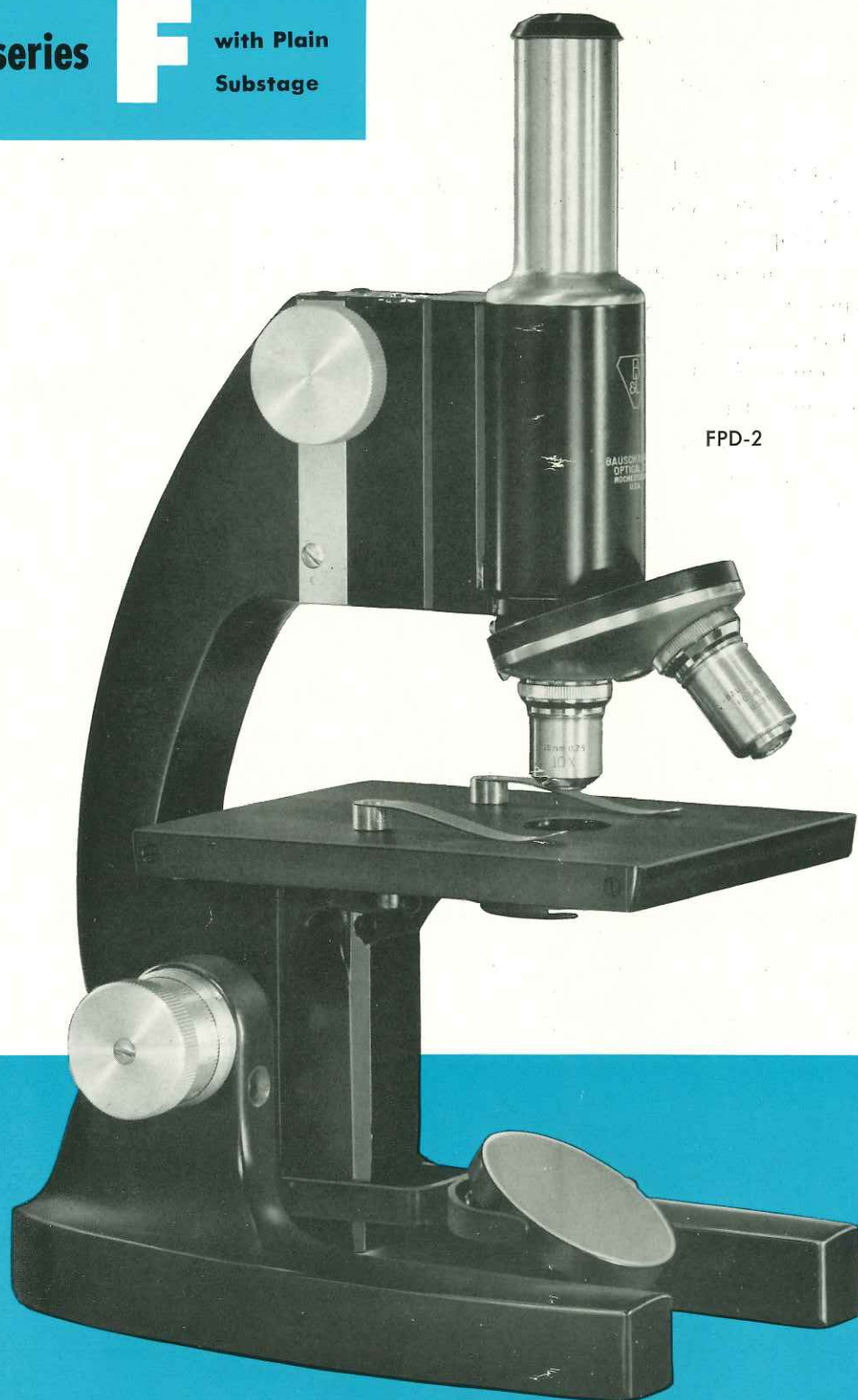
Model No.	Stage	Substage 1.25 N.A. Condenser	Objectives	Eyepieces
FPV-6	Plain	Var. Focus	10X, 43X Achromatic in Double Nosepiece	5X, 10X Huygenian
FPR-6		Abbe		
FBV-8	Mech.	Var. Focus	10X, 43X, 97X Achromatic in Triple Nosepiece	
FBR-8		Abbe		
FPV-8	Plain	Var. Focus		
FPR-8		Abbe		
FBV-9	Mech.	Var. Focus	3.5X, 10X, 43X, 97X Achromatic in Quadruple Nosepiece	
FBR-9		Abbe		

Optional accessories, including Opti-lume integral illuminator and Micro-Lite on pages 24-25.

series

F

with Plain
Substage



FPD-2

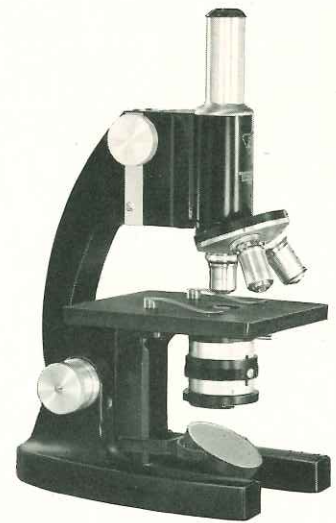


FPM-7

The Fixed Monocular Tube Series. Tube is not interchangeable with a binocular body.

Recommended for elementary botany, zoology and biology in high schools and colleges.

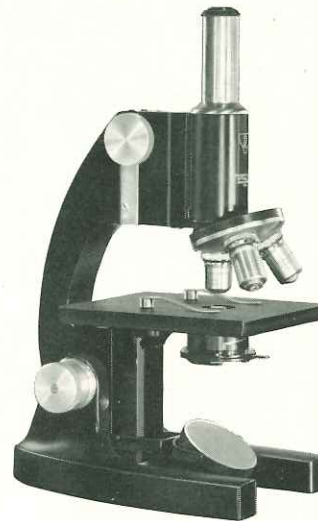
All models in this series have matched rack and pinion coarse adjustment; ball-bearing and roller low position fine adjustment with one micron divisions; *Roto-sphere* ball-bearing, ball-stop, precentered nosepiece; plain substage; plano-concave mirror in fork quick-on bracket; alcohol- and reagent-resistant black finish; in hardwood cabinet. Standard models listed below are with plain stage but a removable mechanical stage, either graduated or ungraduated, can be supplied.



FPH-8



FPS-6

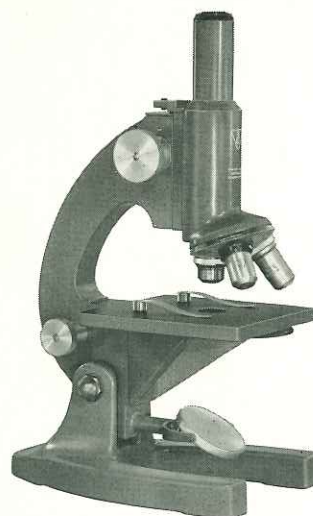
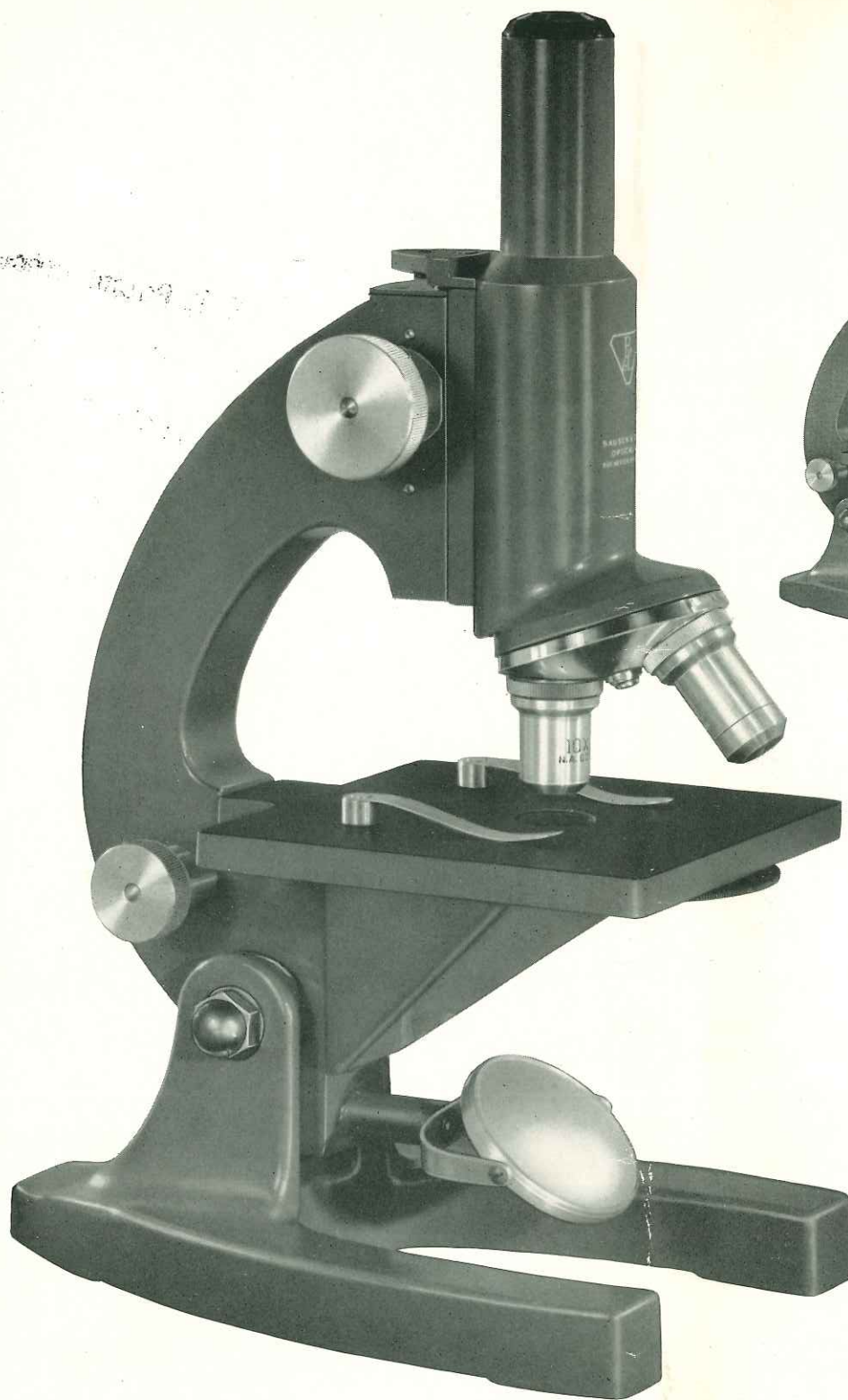


FPS-8

STANDARD MODELS

Model No.	Stage	Substage Equipment	Achromatic Objectives	Huygenian Eyepieces
FPD-2	Plain	Iris Diaphragm	10X, 43X in Dbl. Nosepiece	10X
FPM-5		.70 N.A. Condenser In Sleeve Mount	4X, 10X, 43X in Triple Nosepiece	5X, 10X
FPM-7			3.5X, 10X, 43X in Triple Nosepiece	
FPS-6		Abbe 1.25 N.A. Condenser in Sleeve Mount	10X, 43X in Double Nosepiece	
FPS-8			10X, 43X, 97X in Triple Nosepiece	
FPH-8		Var. Focus Cond. in Tubular Mount		

Optional accessories, including Opti-lume integral illuminator and Micro-Lite on pages 24-25.



FL-27



FL-23

FL-22

STANDARD MODELS

Model No.	Substage	Achromatic Objectives
FL-22	Mirror	10X, 43X in Dbl. Nosepiece
FL-23	Opti-lume	
FL-27	Mirror	3.5X, 10X, 43X in Triple Nosepiece

**no other
student microscope
has all
these features**

Inclination Joint — Like a laboratory microscope, a valuable feature to accommodate students of different heights.

series **FL** student microscope

Full standard size (Not Dynoptic)

Inexpensive enough to fit into even the most limited budgets, the *FL* is of simple, sturdy construction. Easily maintained, it will provide many years of precise, efficient performance. In the event of mishap resulting in a damaged instrument, replacement parts are available at extremely low cost. Especially for high school science classes but applicable whenever a low cost, monobjective microscope providing magnifications up to $430\times$ is adequate.

The only student microscope with prefocusing gage; 100% achromatically corrected, color-coded objectives; and built like a conventional microscope. High school students trained in the operation of the *FL* feel right at home when using microscopes in higher education courses.

With the gage you quickly and simply accomplish prefocusing for any thickness slide—so precisely that there is hardly ever any further adjustment even on the fine focusing knob. It saves hours of time in the classroom and does away with frustrating searching.

Markedly better resolution with gratifying flatness of field features the *FL* objectives. They are parfocal even with the standard laboratory type. $10\times$ and $43\times$ objectives in a revolving double nosepiece are regularly furnished. If a third objective is desired a triple nosepiece can be supplied together with a standard objective of the desired power.

U. S. Patent Office
AUG 19 1955
Design Division

First Full Standard Size microscope designed especially for student use. $12\frac{1}{2}$ " high — not just standard height but full standard size — proper microscope technique is taught from the beginning.

Two Focusing Adjustments—Rack and pinion coarse and separate low position fine adjustment with convenient knobs on both sides to permit quick and critical focusing.

Prefocusing Gage eliminates lengthy searching, gives quick, accurate focus for any thickness slide.

Self-Lubricating Composition Slide — Motion tested through 75,000 excursions (equal to two lifetimes of normal student use), no measurable wear found.

Locked-In, Removable Eyepiece cannot drop out but is easily removed to clean or replace.

Even $100\times$ and $430\times$ Magnifications with the improved achromatically corrected objectives. Better resolution and flatter fields. They're color-coded for correct selection.

Use Any Light Source—Concave mirror and disc aperture diaphragm for daylight or artificial illumination. Integral illuminator or separate light sources. Stage is cool and specimen unharmed.

All-Metal Construction — No chipping, no warping, no cracking. Full size stage will accept attachable mechanical stage.



Optional equipment

Opti-lume attachable integral illuminator for binocular microscopes

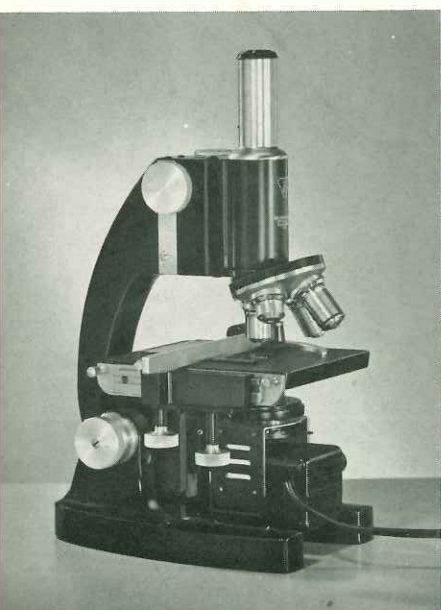
Designed primarily to provide the additional light required for all types of binocular microscope applications, from low power to oil immersion, this illuminator is also ideal for use with monocular microscopes when examining thick, heavily stained specimens. The field of view for any objective is completely and uniformly illuminated when the *Opti-lume* is attached to either an Abbe or Variable Focus Condenser. To fill the field of low power objectives when the *Opti-lume* is used separate from the microscope it is essential that the microscope be fitted with the Variable Focus Condenser.

Featuring an aluminized metal reflector, spherical condenser, and frosted white glass, it will supply over three times more light than others at all comparable in price.

Easily and quickly attached to the microscope by means of a U-shaped bracket with a tongue and groove fitting into two sides of the lamphouse, the *Opti-lume* focuses with the substage condenser and tilts with the microscope. Attachment to the tubular condenser is by means of the same bracket.

Travel of the substage condenser is not limited in any way. The illuminator assembly is feather-light, eliminating all danger of increased wear on rack and pinion substages.

Sturdy, compact, and inexpensive, the *Opti-lume* has a simply designed phenolic lamphouse with ventilating louvers. A shield around the lamp, and space between the illuminator and the stage, prevent heat damage to specimens. The lamp is 115-v., 15-w., clear, medium screw base, available wherever commercial lamps are sold. A built-in switch is provided.



Microscope Cases

All microscopes listed in this catalog, with the exception of the model *FL*, are supplied in hardwood case. The case is solid cherry, in natural finish, and is a beautiful example of the cabinetmaker's art. It is equipped with lock and key and is designed to accommodate both the microscope and equipment listed with it.

A blue, leatherette-covered, horizontal, professional type carrying case is also available, either as an extra, or in place of the hardwood cabinet at extra cost. Case is equipped with lock and fasteners and like the hardwood case, will accommodate microscope and equipment listed with it.

The model *FL* microscope is supplied in corrugated carton as standard equipment. However, it can be supplied in hardwood case, leatherette covered case, as described above or in a metal case designed specifically for it, as optional equipment at extra cost.

Opti-lume attachable integral illuminator for monocular microscopes

This standard *Opti-lume* for monocular microscopes is designed to provide adequate illumination for examinations with low and medium power objectives. It features the same desirable advantages listed for the binocular microscope *Opti-lume*, with the exception of the spherical condenser and aluminized reflector, and with frosted blue glass instead of white.

**Both the binocular microscope Opti-lume and the regular can be used separate from the microscope, with a mirror.*

Micro-Lite

Here is an abundance of illumination for your transparent specimen work, in convenient form and at an attractively low price. The *Micro-Lite* is compact (only 9" x 3 1/2"), lightweight (just over 2 lbs. including cord), and uses an ordinary 60-watt lamp, obtainable practically everywhere.

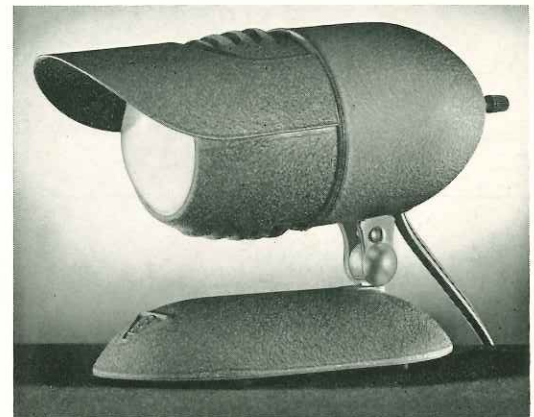
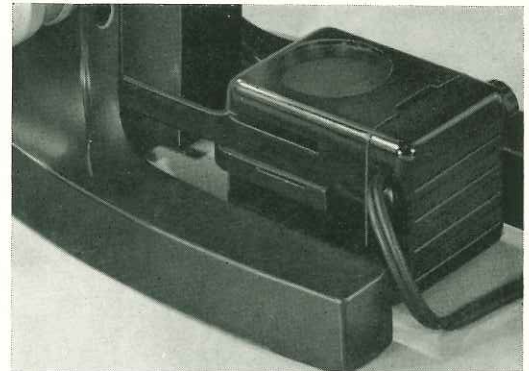
Louvers on the top and bottom permit flow of air around the lamp and prevent overheating of the lamphouse. The ball and socket joint, pressure controlled, permits directing the light in any direction.

The condensing lens is of the bull's-eye type with one surface ground to provide evenly diffused illumination. A blue filter behind the condenser produces light of about daylight quality, and an anti-glare shield above the lens completely protects the user's eyes from stray light.

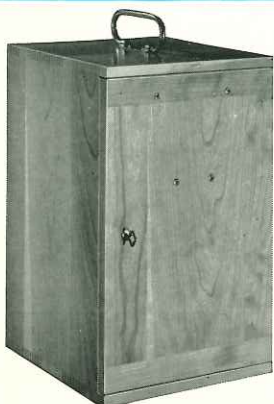
A built-in switch with 6 ft. of Underwriters approved cord is provided. You simply plug it into any 115-120-volt light circuit and it's ready to go to work. The base, heavy enough to prevent tipping over, has four felt-padded feet to protect table tops.

The *Opti-lume* for use on Series F Microscopes with plain substage.

(To attach the *Opti-lume* to microscopes with D, S, or M substage the H-bracket is used in place of the mirror.)



The *Micro-Lite*



Hardwood



Professional



Metal — for FL

MORE BAUSCH & LOMB PRODUCTS FOR FULLER, RICHER LIVING

YACHTING
RACING
ROVING



Precision

IMAGES WITH B&L BINOCULARS

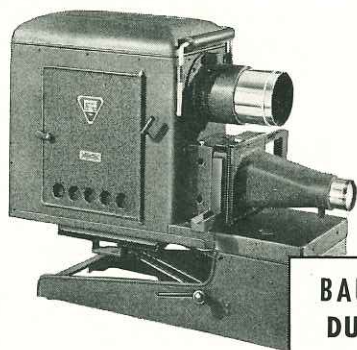
You'll get a real thrill seeing sights you are now missing if you carry a B&L binocular wherever you go.



*Your
Eyes*

NEED A CHANGE

● Changes in vision may occur gradually or suddenly, unbeknown to you. If you wear glasses and your correction was not recently made, it may now be inadequate. Don't take chances with your eyes. Have a periodic examination by a qualified ophthalmologist or optometrist.



BAUSCH & LOMB DUAL PURPOSE LRM BALOPTICON

DOUBLE ENJOYMENT IN PROJECTION

- Shows both slides and opaque objects
- Sharp, brilliant screen images
- Balanced illumination in both systems
- Built-in blower cooling system



Compare a B&L reading glass or magnifier with any other. You'll see what a difference the finest materials and workmanship make. There is no substitute for the best. The Bausch & Lomb name assures you of optical excellence.

BAUSCH & LOMB

OPTICAL COMPANY



ROCHESTER 2, N. Y.

TERMS AND PROCEDURE

CATALOG NUMBERS

When ordering, be sure to give catalog number and name of item.

FINANCIAL STANDING

To avoid a delay, a purchaser with whom Bausch & Lomb has not previously transacted business should accompany his first order with commercial references or remittance in cash.

TRANSPORTATION CHARGES

Unless otherwise stated on a B&L quotation, all consumer purchases, except repairs, will be shipped transportation charges prepaid to any point within Continental United States of America. Other-than-consumer purchases, all repairs, and goods for delivery outside the above specified area will be shipped f.o.b. Rochester, N. Y., U. S. A. The shipping charges on products sent on memorandum are not prepaid. There is no charge for packing unless otherwise stated. Products made on special order cannot be forwarded C. O. D.

SHORTAGE OR DAMAGE

To avoid error, Bausch & Lomb exercises the utmost care in checking and packing all shipments. All packing should be carefully examined for small items. If a discrepancy is found, report it to Bausch & Lomb immediately. Report to the transportation company at once any claim for loss, damage or breakage. Carriers are responsible for loss or damage to goods in transit. When shipping container shows damage, do not give a clear receipt, but sign for "in bad order." Save the container and obtain an inspection report from the carrier.

RETURNING GOODS

If it is desired to return goods, first send Bausch & Lomb full information by letter. Goods should not be returned for any reason until approval for their return has been received from Bausch & Lomb. Each item should be plainly tagged with sender's name and address. Identification tags will be sent on request.

ELECTRICAL EQUIPMENTS

Electrical equipments for use on voltages other than those listed are available on special order. Send complete specifications for quotations.

INQUIRIES

When writing, please give the date of your order, the Bausch & Lomb order number which appears on the packing slip and, if possible, the Bausch & Lomb invoice number.

PRICES

Prices are subject to change without notice. Orders are subject to acceptance at Rochester, N. Y., U. S. A., at prices prevailing at time of shipment. Orders for standard items may be cancelled if not wanted because of price advance. Excise taxes or other governmental charges will be added wherever applicable. Shipments to points outside Continental United States of America and to its territories, dependencies and possessions, except Hawaii and Alaska, are not subject to excise taxes. Delivery dates are estimated and cannot be guaranteed.

DESIGN CHANGES

Bausch & Lomb reserves the right to make changes in instrument design in accordance with scientific progress, and to supply apparatus resultingly different from that described or illustrated in its literature.



BAUSCH & LOMB OPTICAL CO.

Rochester 2, New York, U. S. A.

Bausch & Lomb products can be obtained from the following offices as well as from distributors and dealers in the United States and in other principal countries throughout the world:

Branch Offices and Subsidiaries

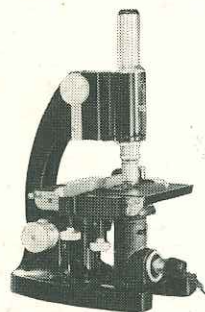
NEW YORK, NEW YORK	Bausch & Lomb Optical Co., 730 Fifth Avenue
CHICAGO, ILLINOIS	Bausch & Lomb Optical Co., 18 S. Michigan Avenue
SAN FRANCISCO, CALIFORNIA	Bausch & Lomb Optical Co., 20 Jones Street
TORONTO, ONTARIO, CANADA	Bausch & Lomb Optical Co., Ltd., 16 Grosvenor Street
MONTREAL, QUEBEC, CANADA	Bausch & Lomb Optical Co., Ltd., 1449 St. Alexander Street
LONDON, ENGLAND	Bausch & Lomb Optical Co., Ltd., Africa House, Kingsway, W. C. 2
RIO DE JANEIRO, BRASIL	Bausch & Lomb do Brasil Ltd., Rua Assembleia, 104-8° Pavt°
São Paulo, Brasil	Bausch & Lomb do Brasil Ltd., Rua Libero Badaro, 158-8°
BUENOS AIRES, ARGENTINA	Bausch & Lomb Argentina, S. A., 740 Avenida R. Saenz Peña
STOCKHOLM, SWEDEN	Aga-Bausch & Lomb, A. B., Malmskillnadsgatan 39v

District Offices

BOSTON DETROIT LOS ANGELES PHILADELPHIA WASHINGTON

ADDITIONAL OPTICAL EQUIPMENT

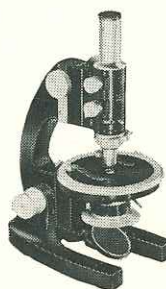
The microscopes and accessories described in this catalog are part of a complete line of optical instruments produced by Bausch & Lomb. A few others, all essential to the well-equipped microscope laboratory, are shown below. Catalogs describing these top quality "tools of science" will be sent you on request.



Dark Field Microscopes

An optical system for use with various types of condensers for the widest range of examination.

U.S. Patent Office
AUG 9 1955
Design Division



Polarizing Microscopes

Finding increased applications in practically every field of microscopy the popularity of these modern instruments is growing.



Research Microscopes

A most complete group of the finest research instruments built to give years of satisfactory performance.



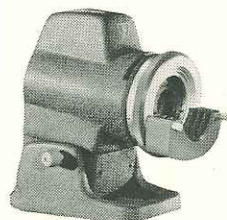
Phase Contrast Accessories

Two types of condensers furnish a choice of equipment for this latest technique for the examination of living specimens.



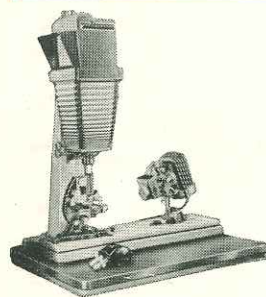
Stereomicroscopes

A complete line of Wide Field instruments, featuring dustproof prism housings, improved optical elements.



Microscope Illuminators

The most extensive series of high grade instruments for any microscope illumination problem.



Photomicrographic Equipment

A variety of Cameras for satisfactory use in both transmitted and reflected light microscopy from routine to the research level.



Micro-projection Equipment

Wide range of types to answer the needs of a diversity of users in education, and general laboratory work.

BAUSCH & LOMB OPTICAL CO.

ROCHESTER 2, NEW YORK, U. S. A.

PRICE LIST for CATALOG D-185

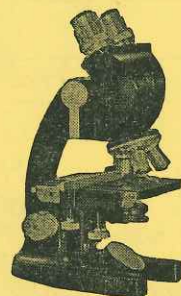
BAUSCH & LOMB DYNOPTIC LABORATORY MICROSCOPES

May 1, 1955

SERIES T (Page 15)

Inclined

Binocular Body



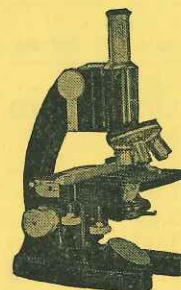
Model	Price	
	Uncoated	Balcote
TBV-8	\$570.00	\$636.00
TBR-8	563.00	629.00
TPV-8	528.00	594.00
TPR-8	521.00	587.00
TBV-9	594.00	665.00
TBR-9	587.00	658.00
TPV-9	552.00	623.00
TPR-9	545.00	616.00
TBV-69	593.00	*655.00
TBR-59	562.00	*619.00
TBV-10	626.00	691.00
TBR-10	619.00	684.00

*10× Wide Field eyepieces,
Balcoted.

SERIES C (Page 17)

Convertible

Monocular Tube

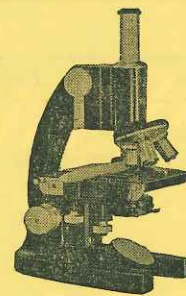


Model	Price	
	Uncoated	Balcote
CBV-8	\$392.00	\$429.00
CBR-8	385.00	422.00
CPV-8	350.00	387.00
CPR-8	343.00	380.00
CBV-9	416.00	458.00
CBR-9	409.00	451.00
CPV-9	374.00	416.00
CPR-9	367.00	409.00

SERIES F (Page 19)

Fixed Monocular

Tube, with Rack and Pinion Substage Equipment

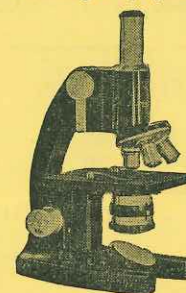


Model	Price	
	Uncoated	Balcote
FPV-6	\$259.00	\$285.00
FPR-6	252.00	278.00
FBV-8	363.00	400.00
FBR-8	356.00	393.00
FPV-8	321.00	358.00
FPR-8	314.00	351.00
FBV-9	387.00	429.00
FBR-9	380.00	422.00

SERIES F (Page 21)

Fixed Monocular

Tube, with Plain Substage Equipment



Model	Price	
	Uncoated	Balcote
FPD-2	\$212.00	\$229.50
FPM-5	254.00	
FPM-7	261.00	
FPS-6	237.00	263.00
FPS-8	299.00	336.00
FPH-8	309.00	

Graduated Drawtube, instead of fixed length tube, can be
supplied on monocular microscopes, add \$5.00 to price.

OPTI-LUME ILLUMINATOR

Any Dynoptic Laboratory Microscope listed in this catalog can be supplied without mirror but with the *Opti-lume* attached to the substage. The price of the microscope with *Opti-lume* is arrived at by deducting \$8.00 for the mirror and adding the cost of whichever *Opti-lume* is desired. To order the microscope with *Opti-lume* attached simply add Letter L and last two numerals of *Opti-lume* catalog number to the microscope designation, i.e. TBR-8L42. If the *Opti-lume* is to be used separate from the microscope, order the latter by its regular designation which will include the mirror and also order the *Opti-lume* extra by its number with or without bracket.

Catalog No.	Description	Price
31-33-02-42	<i>Opti-lume</i> Illuminator for Binocular Microscopes, with 31-34-47 bracket and adapter for H, R, and V substages	\$11.00*
31-33-02-11	<i>Opti-lume</i> Illuminator for Monocular Microscopes, with 31-34-47 bracket and adapter for H, R, and V substages	7.00*
*Substitute 31-58-20 H-Bracket when ordering for use on Microscopes with D, M, or S substages, at same price.		

REPLACEMENT PARTS

31-31-15	Lamp, clear, 15-w., 115-v.	.23
31-34-19	Daylight ground glass filter, 44mm square	1.35
31-34-21	Blue ground glass filter, 44mm square	.35
31-34-47	Bracket and adapter for attaching <i>Opti-lume</i> to Microscopes with substage condenser	2.00
31-34-77	Reflector, aluminized metal	3.00
31-34-79	Spherical condenser	1.00
31-34-80	Frosted white glass, 44mm square	.35
31-58-20	H-Bracket for attaching <i>Opti-lume</i> to Microscopes with D, M or S substage	2.00

See other side for listing of *Opti-lume* for FL Student Microscope.

SERIES FL—Student Microscope (Page 22)

Model	Price	These FL Student Microscopes are
FL-22	\$114.00	regularly furnished in a corrugated
FL-23	114.00	paper container. If a carrying case is
FL-27	138.00	desired, order extra as listed below.

Opti-lume—Attachable integral illuminator for FL Student Microscopes. The model FL-23 Student Microscope is furnished with the attachable integral *Opti-lume* instead of mirror. Any other FL Microscope can be furnished with the *Opti-lume*. The price of the microscope with *Opti-lume* in place of mirror is arrived at by deducting \$6.50 for the mirror and fork; adding cost of the *Opti-lume* as desired.

Catalog No.	Description	Price
31-33-02-21	<i>Opti-lume</i> , for Model FL Student Microscope, with blue glass filter, mounting bracket, built-in switch and 15-w., 115-v., lamp	\$6.50
31-34-48	Bracket only for mounting <i>Opti-lume</i> on FL Student Microscope .	1.50
31-34-21	Blue ground glass filter, for renewal	.35
31-31-15	Lamp, clear, 15-w., 115-v. . . .	.23

MICRO-LITE (Page 25)

Catalog No.	Description	Price
31-33-01-01	<i>Micro-Lite</i> Illuminator, with 60-w., 115-v. lamp, switch, cord and plug	\$9.50
71-71-13	Lamp, inside frosted, 60-w., 115-v.	.19

MICROSCOPE CASES (Page 24)

31-39-18	Metal case for FL Microscopes .	\$12.00
31-39-95	Leatherette covered, Horizontal Case for <i>Dynoptic</i> and FL Microscopes	25.00
31-39-96	Hardwood, vertical case for <i>Dynoptic</i> and FL Microscopes .	20.00

SIMPLE CENTERING SUBSTAGE (Page 9)

31-01-18	Simple, centering substage, supplied as original equipment on <i>Dynoptic</i> Microscopes with rack and pinion substage . . extra	\$20.00
----------	---	---------

MECHANICAL STAGES

31-59-66-01	Ungraduated mechanical stage, for <i>Dynoptic</i> Microscopes, in leatherette covered case	\$47.00
31-59-67-01	Graduated mechanical stage, for <i>Dynoptic</i> Microscopes, in leatherette covered case	63.00
31-39-22	Leatherette covered case only . .	5.00
31-59-53	Ungraduated mechanical stage, for FL Student Microscope in leatherette case	55.00

Prices are subject to change without notice. Orders are subject to acceptance at Rochester, N. Y., U. S. A., at prices prevailing at time of shipment. Orders for standard items may be cancelled if not wanted because of price advance. Excise taxes or other governmental charges will be added wherever applicable. Shipments to points outside Continental United States of America and to its territories, dependencies and possessions, except Hawaii and Alaska, are not subject to excise taxes. Delivery dates are estimated and cannot be guaranteed.

MONOCULAR TUBES

Catalog No.	Description	Price
31-19-26	Interchangeable Monocular Body Tube with fixed length eyepiece adapter for Series T and C Microscopes	\$18.00
31-19-26-91	Interchangeable Monocular Body Tube with graduated draw tube for Series T and C Microscopes	23.00
31-19-91	Graduated draw tube only . . .	9.00

BINOCULAR BODIES — FOR SERIES T AND C MICROSCOPES

		Uncoated	Balcote
31-19-61	Vertical	\$140.00	\$160.00
31-19-75	Inclined	180.00	200.00

ACHROMATIC OBJECTIVES

Catalog No.	Mag'n ×	E. F. mm	N. A.	Price Uncoated	Balcote
31-10-05-01	2	48	0.08	\$13.00	
31-10-06-01	3.5	30	0.09	21.00	\$26.00
31-10-07-01	2.6	40	0.08	13.00	
31-10-09-01	4	32	0.10	14.00	
31-10-18-01	6	22.7	0.17	21.00	
31-10-19†	10	16	0.25	12.00	
31-10-20-01*	10	16	0.25	21.00	26.00
31-10-22-01°	10	16	0.25	21.00	26.00
31-10-27-01	21	8	0.50	31.00	
31-10-29-01	43	4	0.65	34.00	42.00
31-10-34†	43	4	0.48	20.00	
31-10-71-02	97	1.8	1.25	59.00	70.00

*Unitized
°Divisible
†FL Microscope objectives.

HUYGENIAN EYEPIECES

		Uncoated	Balcote
31-15-05	5×, single	\$ 7.00	\$11.50
31-15-05-02	5×, paired	15.00	24.00
31-15-09	10×, single	7.00	11.50
31-15-09-02	10×, paired	15.00	24.00

WIDE FIELD EYEPIECES (Uncoated only)

31-15-51	10×, single	\$14.00
31-15-51-02	10×, paired	29.00

BAUSCH & LOMB OPTICAL CO.

Rochester 2, New York